

CENTRAL ASIAN JOURNAL OF THEORETICAL AND APPLIED SCIENCES

Volume: 03 Issue: 05 | May 2022 ISSN: 2660-5317

Design of an Effective Heating System for Residential and Public Buildings

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Received 26th Mar 2022, Accepted 15th Apr 2022, Online 29th May 2022

Abstract: *Heating of public buildings is one of the main sections of construction equipment. Heating installation of systems and appliances is carried out simultaneously with the start of construction of the building firstly, it is done together. In recent years, the efficiency of heating systems has been improved in two directions. Firstly, thanks to new innovations and modernization of old heating systems, the efficiency and energy efficiency of heating boilers will increase. The second direction that increases efficiency is the improvement of thermal insulation cladding materials used in construction.*

Keywords: *fuel, heat, amount of heat, heating devices, heating systems, convective heating, heat flow.*

Main body: In order to provide buildings and structures with heat, energy consumption in the Republic of Uzbekistan in a number of countries around the world is steadily increasing.

About a third of the organic fuel will be spent on heating public and industrial buildings. Depending on how deep the process in the extraction of fuels begins to be extracted, it leads to an increase in its value. As a result, it is certain that the demand for saving at the expense of the development of the national economy in our country becomes a major problem. The solution of this issue is the full implementation of centralized heat supply, as well as the thermal power center of the Republic of Uzbekistan reproduction in central cities is one of the main directions. It is known that the main expenditure of the amount of heat that is being spent on the communal farm, residential and public buildings is the cost for heating the premises. In the organization of heating systems of public buildings should pay special attention to the following requirements: effective, reliable, energy-efficient, economical, affordable, and environmentally friendly. [3,8]

Heating of buildings - a method of artificially heating systems and devices for creating moderate microclimate conditions for people in the room and replenishing the amount of heat spent on the demand of technological processes, as well as the total amount of heat lost through the external barriers of the building (exterior walls, roofing, exterior windows, exterior doors and floors). Modern heating systems and appliances should serve the purpose of creating an effective state of human health, creativity and creating comfortable conditions for a person to feel well.

In recent years, an increase in the efficiency of heating systems has been carried out in two directions. First, as a result of new innovations and modernization of heating systems of the old type, the heating of boilers is increased in FIK, as well as energy efficiency. Compared to the boilers that were used five or ten years ago, modern boilers are more fertile, compact and more convenient to use. The second direction,

which increases efficiency, is the work on the perfection of heat-retaining coating materials used in construction. Public building heating is one of the main sections of construction machinery. The installation of heating systems and devices is carried out simultaneously, together with the beginning of the construction of the building. Because with the processes of interior design to give shine to the architectural vision of the interior of the rooms during the design of its elements

It is planned together and carried out in harmony with the building construction. Therefore, thermal systems are an indivisible part of the technology of building construction. In many public and industrial buildings, heating and ventilation systems are used together. And this is one of the main reasons that leads to a decrease in the quality of the product in production, the productivity of workers, the state of feeling good in the process of workers ' labor and their diseases. The spread of heat flux from heating devices to the building is transmitted by convection and radiation. The first indicator that affects the sensory organs of a person standing inside the rooms is the radiation heat that spreads through the inner surface of the wall. The amount of air temperature in the room t_l radiation temperature t_r is controlled continuously. Radiation temperature this barrier is the average temperature of the internal surfaces of the structures, which is the temperature taken relative to the person between the rooms. Convektiv heating is said to the method of heating the room air temperature is always higher than the radiation temperature, IE $t > t_R$way. If $t_R > t_l$ inequality is generated, heating equipment will be selected using more radiation. Because the effect of the heat flow emitted by radiation is pleasant to the sensory organs of a person in relation to the convektiv heat, even if the air temperature in the room decreases. [2,7]

The room that needs to be heated is called heating systems, which receive and carry heat through special equipment, and distribution systems. The main constructive elements of the heating system are divided into three types:

1. The heat source is the heat-forming element (boiler).

2. A heat carrier is an element (heat-carrying tubes) that carries heat from a heat source to heating devices.

3. Heating device-a heat dissipating element designed into the room.

Heat carriers, substances are in motion in the pipe, they are in the liquid and gas state. The main task in front of heating systems and appliances is that these devices must give each room in the premises the amount of heat that was previously calculated. Therefore, in order to determine the thermal capacity of public buildings heating systems, the heat balance is determined by the following formula:

$$\Delta Q = Q_{tors} + Q_{h.a} + Q_{t.i} + Q_{i.y}$$

Q_{tors}**- the lost heat flow through external barriers;;**

$Q_{h.a}$**- the heat flow that is spent to heat the air entering the room;;**

$Q_{t.i}$**- the heat flow which is separated as a result of technological and household process;**

$Q_{i.y}$ **– the part of the lack of heat; [1,6]**

Heating systems are divided into local and central types based on location and range of motion.

Local heating systems serve one building, they consist of the main three elements: the boiler devices of the heat producer, the system of heat-carrying pipes and the heating device installed in the room. As a heat carrier in heating systems, hot water, steam, electric current or belonging to any type

an element is used. Central heating systems consist of heating two or more buildings with heat generated from the same heat-producing boiler installations (heat-producing center). In place of the center of the

heat-generating unit can be boiler installations or heat-exchanger equipment. Currently, as heat carriers in the heat supply systems, water, steam and air are being widely used. [4,5]

The main characteristics of heat carriers can be distinguished by the following table:

Indicators	Heat carriers		
	water	steam	air
	Temperature and temperature difference, ^oC		
	150-70=80	130	60-15=45
Density, kg/m^3	917	1,5	1,03
Comparable heat capacity, kDj/kg ^oC	4,31	1,84	1,0
Specific heat of condensation, condensation, kDj/kg	-	2175	-
The amount of heat required to heat 1 m^3 heat carriers, kDj	316370	3263	46,4
Movement speed, m/s	1,5	80	15
The difference in the cross-sectional surfaces of the heat transfer pipe	1	1,8	680

In conclusion, it can be said that by fully introducing centralized Heat Supply and increasing the thermal power center in large central cities of the Republic, it is possible to organize an effective heating system for residential and public buildings.

Conclusion: Summing up, we can say that centralized heat supply the creation of an effective heating system for residential and public buildings is possible through the full implementation and increase of heat power centers in all central cities of the republic.

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